STANDARD OPERATING PROCEDURE
Procedure for Sampling Foliage for Pesticide Residue

KEY WORDS
Total leaf residue sampling, dislodgeable, leaf punch, foliage deposition

APPROVALS

Original Signed by: **4/26/06**
APPROVED BY: _____ DATE: _____
John Sanders, Ph.D.
Environmental Monitoring Branch Management

4/24/06
APPROVED BY: _____ DATE: _____
Randy Segawa
Environmental Monitoring Branch Senior Scientist

4/27/06
APPROVED BY: _____ DATE: _____
Carissa Ganapathy
Environmental Monitoring Branch Quality Assurance Officer

4/24/06
PREPARED BY: _____ DATE: _____
Parakrama Gurusinghe, Ph.D.
Associate Environmental Research Scientist

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1.0 INTRODUCTION

1.1 Purpose

This Standard Operating Procedure (SOP) discusses the procedures for sampling foliage to quantify the amounts of pesticide deposited following an application.

1.2 Definitions

1.2.1 **Total Residue Samples**: A plant sample used to quantify the amount of pesticide inside the plant tissue and on the surface of the plant. The residues are reported as weight of pesticide per weight of material sampled. Plant leaves and sometimes twigs are collected as a sample.

1.2.2 **Dislodgeable Sample**: A plant sample used to quantify only the pesticide on the leaf surface and is reported as weight of pesticide per leaf area of the sample. Dislodegeable samples are collected to determine the potential for human dermal exposure to a pesticide. This sample cannot be frozen and must be delivered to the lab as soon as possible. The lab conducts a “wash” according to their SOP and extracts the wash for pesticide residues. There are two types of dislogeable samples; leaf disc punches and whole leaf samples.

2.0 MATERIALS

2.1 Disposable gloves

2.2 Glass jars

2.3 Collection tools (clippers, forceps, scissors)

2.4 Leaf disc punch (2.5 cm diameter punch or 1.8 cm diameter punch)

2.5 Dry ice

2.6 Wet ice

2.7 Balance (minimum 600 gm., resolution 0.1 gm.)

2.8 Chain of custody (COC) forms

2.9 Pen

2.10 Clipboard

2.11 Alcohol

2.12 Deionized water

2.13 Liquid Nox® liquid cleaning soap

2.14 Plastic bags (4 inch x 8 inch or larger) to hold clippers and towels

2.15 Plastic garbage bags (13-gallon size)

2.16 Cleaning sponges or abrasive scrubbing pads

2.17 Paper towels

3.0 PROCEDURES

3.1 Preparation

3.1.1 Label bottles and create COCs as in SOP ADMN006.01.

3.1.2 Wear disposable gloves and follow all the worker health and safety personal protective equipment (PPE) requirements on the pesticide label. Change disposable gloves after every sample.

3.1.3 Set-up a temporary “work platform” (e.g., folding table) to keep the balance, sampling bottles, COCs etc.

3.1.4 Calibrate the balance, weigh the sampling bottle/jar (with out the lid), and record the empty bottle weight on the COC.

3.1.5 Collect the samples as described in section 3.2 and 3.3.

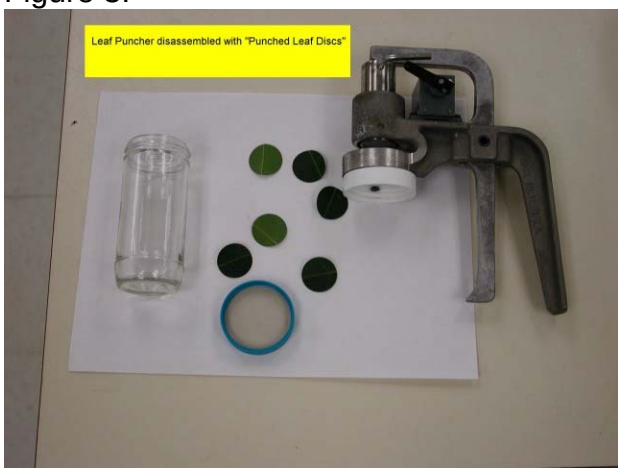
3.2 Dislodgeable Leaf Punch Sample Collection

With a clean leaf punch collect “leaf discs” by using a 2.5 cm diameter punch or 1.8 cm diameter punch. The number and diameter of discs can vary as per the study protocol. Make sure that the disk is a full circle (see the appendix for photographs). Discs that are partial circles will underestimate leaf area sampled.

Figure 1.

Figure 2.

Figure 3.



3.2.1 Record the weight and number of discs on the COC.

3.2.2 Record plant name, location, date/time, and other pertinent sampling information on the COC.

3.2.3 Seal the mouth of the sampling bottle by screwing on the lid.

3.2.4 Store samples according to SOP QAQC004.01, keep at 4^0 C as soon as possible, and do not freeze.

3.2.5 Deliver the samples to laboratory as soon as possible.

3.3 Dislodgeable whole Leaf Sample Collection

3.3.1 Clip the leaves with clean clippers, and let the leaves drop directly to the jar.

3.3.2 If necessary use clean forceps to transfer clipped leaves into the jar, and minimize contact with the sample. The sample size is determined as per the study protocol.

3.3.3 Record plant name, location, date/time, and other pertinent sampling information on the COC.

3.3.4 Weigh the sample and jar without the lid. Enter the values on the COC.

3.3.5 Seal it with aluminum foil, between jar and lid.

3.3.6 Store samples according to SOP QAQC004.01; keep at 4^0C as soon as possible. Do not freeze.

3.3.7 Deliver the samples to laboratory as soon as possible, generally within 24 hours or less. The leaves must we washed at the lab as soon a possible to avoid residues moving inside the plant tissue.

3.3.8 After the laboratory has returned the “washed” leaves press, dry, and measure the total leaf area using a leaf area meter if required in the protocol. Press the leaves by placing individual leaves between clean dry paper towels, stack them on a flat surface with a weight on top. Keep the stacks in a dry chamber. If dry weight is required in the protocol, weigh the dry leaves just after drying the sample but prior to placing on the leaf area meter.

3.4 Total Foliage Residue Samples

3.4.1 Sample collection is the same as in Leaf Sample procedure from 3.3.1 to 3.3.4.

3.4.2 Store sample according to SOP QAQC004.01, keep at –20 ^{0}C, or on dry ice. The entire leaf is extracted and analyzed by the lab.

4.0 CLEANING EQUIPMENT

4.1 Follow this general procedure to clean hand clippers and leaf punches or any other tools that will be re-used.

4.1.1 Immerse in a solution of de-ionized water and Liquid-Nox cleaning soap.

4.1.2 Using a clean sponge or abrasive scrubbing pad, vigorously scour the clipper cutting blades/ leaf punch to remove all plant residue which may have built up on the cutting surface. Also thoroughly clean the remaining portion of the hand clippers/leaf punch.

4.1.3 Rinse copiously with de-ionized water and then with alcohol. Let them dry.

4.1.4 After the sampling equipment are clean and dry, place hand clippers/leaf punches in individual clean plastic bags. Mark the plastic bag with date cleaned and initials.

5.0 SAFETY

It is a good practice to wear gloves in pesticide related studies. In addition, always follow the pesticide label recommended PPE in appropriate situations. If more than one pesticide is used, wear the most stringent PPE.

6.0 REFERENCES

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